**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (currently amended): An apparatus for providing non-contact thermal measurements of an active electronic device at high spatial and thermal resolutions, comprising:

an illumination source;

means for generating an electrical signal in response to registration of the magnitude of light received from said illumination source that is reflected from the surface of an ~~object~~ active electronic device;

said means for generating ~~a signal comprising~~ an electrical signal comprises an illumination detector;

means for subjecting said ~~object~~ active electronic device to modulated thermal excitation in response to changes in operating current or device state of said active electronic device; and

means for generating a bandwidth-limited AC-component of the signal from said illumination detector in response to changes in thermoreflectivity from a surface of said ~~object~~ active electronic device arising while said ~~object~~ active electronic device is subjected to said modulated thermal excitation.

2. (currently amended): An apparatus for providing non-contact thermal measurements of active electronic devices at high spatial and thermal resolutions, comprising:

an illumination source;

an array of individual illumination detectors;

said illumination detectors configured to generate signals in response to registration of the magnitude of light received from said illumination source that is reflected from the surface of an ~~object~~ active electronic device;

a circuit for modulating the thermal excitation of said ~~object~~ active electronic device at a known frequency in response to changes in operating current or device state; and

a signal processor;

said signal processor configured to filter one or more direct current components from said signal while said ~~object~~ active electronic device is subjected to modulated thermal excitation to discern a thermoreflectance signal associated with said known frequency, from noise.

3. (currently amended): An apparatus as recited in claim 1, wherein said means for generating a signal in response to registration of the magnitude of light, ~~received from said illumination source that is reflected from the surface of an object~~ comprises:

an array of individual illumination detectors.

4. (original): An apparatus as recited in claim 3, wherein:

said array of illumination detectors is adapted to generate information on the intensity of light received by each of said individual illumination detectors in the array.

5. (original): An apparatus as recited in claim 1 or 2, further comprising:

a display;

said display adapted for displaying a bandwidth-limited AC-component of the signal.

6. (previously presented): An apparatus as recited in claim 1 or 2, further comprising:

means for receiving a bandwidth-limited AC-component of the signal associated with a known frequency of said modulated thermal excitation and computing a thermal measurement based on a change in registered surface reflectance.

7. (currently amended): An apparatus as recited in claim 6:

wherein said ~~object~~ active electronic device has a known thermoreflectance constant; and

wherein said change in registered surface reflectance is in response to a change in the thermoreflectance coefficient of the surface material of said ~~object~~ active electronic device resulting from a temperature change associated with said thermal excitation.

8. (original): An apparatus as recited in claim 1 or 2, further comprising:

means for generating a superresolution image from a combination of thermal images having a lower spatial resolution.

9. (original): An apparatus as recited in claim 8, wherein said means for generating a superresolution image comprises:

a computer; and

programming associated with said computer for,

receiving a plurality of thermal images having a first image resolution, and

combining said thermal images having said first resolution by interpolating pixel values into a thermal image having a higher second resolution.

10. (original): An apparatus as recited in claim 1 or 2, wherein said illumination source comprises a laser light source.

11. (original): An apparatus as recited in claim 10, wherein said laser light source operates at wavelength ranging from approximately 500 nm to approximately 800 nm.

12. (original): An apparatus as recited in claim 10, wherein said laser light source has a wavelength of approximately 655 nm.

13. (original): An apparatus as recited in claim 10, wherein said laser light source has an output power ranging from approximately 1 mW to approximately 100 mW.

14. (original): An apparatus as recited in claim 10, wherein said laser light source has an output power of approximately 5 mW.

15. (currently amended): An apparatus as recited in claim 1 or 2, further comprising:

an x-y translation stage;

said translation stage configured to provide motion to said illumination source and said illumination detector in relation to the surface of said ~~object~~ active electronic device;

wherein a thermal image may be constructed from data collected during scanning of the surface of said ~~object~~ active electronic device.

16. (currently amended): An apparatus as recited in claim 15:

wherein said x-y translation stage comprises a piezoelectric translation stage;

wherein said translation stage provides movement resolution that is approximately equal to or higher than the desired spatial resolution at which the ~~object~~ active electronic device is being measured.

17. (original): An apparatus as recited in claim 1 or 2:

wherein said illumination source is configured to generate a beam spot size that approximates, or is less than, the desired spatial resolution of thermal measurement.

18. (original): An apparatus as recited in claim 17, further comprising:

an inverse-filter which is applied to remove image blurring caused by an excessively large illumination spot size.

19. (original): An apparatus as recited in claim 1 or 2, wherein said illumination detector comprises a photodiode.

20. (original): An apparatus as recited in claim 2 or 3, wherein said array of illumination detectors comprises an array of photodetectors ranging in size from approximately 16 x 16 array to approximately 64 x 64.

21. (currently amended): An apparatus as recited in claim 2 or 3, wherein said array of illumination ~~detector~~ detectors comprises an array of photodetectors ranging in size from approximately 2 x 2 to approximately 256 x 256.

22. (currently amended): An apparatus as recited in claim 1 or 2, wherein the frequency range of said modulated thermal excitation to which said ~~object~~ active electronic device is subjected ranges from approximately 0.1 Hz to approximately 100 kHz.

23. (currently amended): An apparatus as recited in claim 1, wherein said means for generating a bandwidth-limited AC-component of the signal from said illumination detector while said ~~object~~ active electronic device is subjected to modulated thermal excitation comprises:

a signal processor;

said signal processor configured to filter one or more direct current components from said signal to discern a thermoreflectance signal from noise;

said filter adapted with a passband associated with said thermal excitation.

24. (original): An apparatus as recited in claim 2 or 23, wherein said signal processor is selected from the group of narrow band filters consisting essentially of a lock-in amplifier, differential boxcar averaging circuit, and FFT analyzer.

25. (original): An apparatus as recited in claim 2 or 23, wherein said signal processor is configured to filter out components of the signal other than a single harmonic of the registered illumination level.

26. (currently amended): A method as recited in claim 25:

wherein said single harmonic that is at, or associated with, the frequency of thermal modulation to which said ~~object~~ active electronic device is subjected.

27. (original): An apparatus as recited in claim 2 or 23, wherein said signal processor is configured to pass a band of frequencies that is less than approximately 10 Hz.

28. (original): An apparatus as recited in claim 2 or 23, wherein signal processor has a passband having a maximum width of approximately 1 Hz.

29. (original): An apparatus as recited in claim 2 or 23, wherein said signal processor is configured to pass a band of frequencies that is limited to approximately 0.1 Hz.

30. (currently amended): An apparatus as recited in claim 1 or 2, further comprising:

an imaging device adapted to receive a portion of the reflected illumination for aligning position of the illumination source in relation to the ~~object~~ active electronic device.

31. (original): An apparatus as recited in claim 30, further comprising:

a splitter configured to direct portions of said reflected illumination to said imaging device.

Claims 32-39 (canceled)

40. (currently amended): A method for providing high resolution thermal imaging of an active electronic device ~~an object being subjected to thermal modulation at a known frequency range~~, comprising:

modulating the device state or operating current of an active electronic device within a selected frequency range;

illuminating an area on the surface of an ~~object~~ active electronic device for which thermal information is desired;

detecting illumination reflected from said area; and

generating an AC-coupled bandwidth-limited signal in response to detected illumination associated with the ~~known~~ selected frequency of thermal modulation and thermoreflectivity changes of said ~~object~~ active electronic device.

41. (currently amended): A method as recited in claim 40:

wherein said AC-coupled signal has a bandwidth with a center at, or associated with, the frequency of modulation of the device state or operating current to which said ~~object~~ active electronic device is subjected as a source of thermal excitation.

42. (original): A method as recited in claim 40, further comprising:

resolving the AC-coupled signal into an image.

43. (currently amended): A method for providing high resolution thermal imaging of an active electronic device ~~object being subjected to thermal modulation at a known frequency range~~, comprising:

modulating the device state or operating current of an active electronic device according to a selected frequency to produce thermal modulation;

illuminating an area on the surface of an object for which thermal information is desired;

detecting illumination reflected from said area in response to changes in thermoreflectance of the surface as subjected to thermal modulation;

generating an AC-coupled bandwidth-limited signal in response to detected illumination and in response to modulation at said selected frequency~~within the known frequency range~~; and

resolving the AC-coupled signal into an image.

44. (currently amended): A method as recited in claim 43:

wherein said AC-coupled signal has a bandwidth with a center at, or associated with, the frequency of thermal modulation to which said ~~object~~ active electronic circuit is subjected.

Claims 45-48 (canceled)

49. (new): An apparatus as recited in claim 1, wherein said means for generating bandwidth-limited AC-component of the signal is configured for recovering amplitude and phase information.

50. (new): An apparatus as recited in claim 49, wherein said amplitude and phase information are represented in an image of non-contact thermal measurement.

51. (new): An apparatus as recited in claim 2, wherein said signal processor is further configured for recovering amplitude and phase information from said signal.

52. (new): An apparatus as recited in claim 51, further comprising a display adapted to represent said amplitude and phase information.

53. (new): A method as recited in claim 40, further comprising recovering amplitude and phase information from said AC-coupled bandwidth limited signal.

54. (new): A method as recited in claim 53, further representing amplitude and phase information as a thermal image output.

55. (new): A method as recited in claim 43, further comprising recovering amplitude and phase information from said AC-coupled bandwidth limited signal.

56. (new): A method as recited in claim 55, further representing amplitude and phase information as a thermal image output.

57. (new): An apparatus for providing non-contact thermal measurements of an active electronic device at high spatial and thermal resolutions, comprising:

an illumination source;

an array of individual illumination detectors configured for generating an electrical signal in response to registration of the magnitude of light received from said illumination source that is reflected from the surface of an active electronic device; and

an electronic circuit configured for generating a bandwidth-limited AC-component of the electrical signal from said array of illumination detectors in response to changes in thermoreflectivity from a surface of said active electronic device arising in response to modulation of the operating current or device state changes of said active electronic device which results in modulated thermal excitation.

58. (new): A method for providing high resolution thermal imaging of an active electronic device, comprising:

modulating the device state or operating current of an active electronic device within a selected frequency range;

illuminating an area on the surface of an active electronic device for which thermal information is desired;

detecting illumination reflected from said area within a detector or imaging array, wherein the illumination is detected over the area at a specific time without the necessity of scanning the illumination and detectors over the surface of said area;

generating an AC-coupled bandwidth-limited signal in response to amplitude and phase information recovered from said AC-coupled bandwidth limited signal associated with the selected frequency of thermal modulation and thermoreflectivity changes of said active electronic device; and

representing amplitude and phase information as a thermal image output.

59. (new): A method as recited in claim 58, further comprising increasing the resolution of said thermal image output to a second resolution in response to superresolution methods performed on a set of images at a first resolution, wherein said second resolution is higher than said first resolution.